Name:

at1118paper: Complete the Square (v408)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 44x = -468$$

Add $\left(\frac{-44}{2}\right)^2$, which equals 484, to both sides of the equation.

$$x^2 - 44x + 484 = 16$$

Factor the left side.

$$(x - 22)^2 = 16$$

Undo the squaring. We need to consider both $\pm\sqrt{16}$.

$$x - 22 = -4 \quad \text{or} \quad x - 22 = 4$$
$$x = -26 \quad \text{or} \quad x = -18$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 6x = 775$$

$$x^2 - 6x + 9 = 784$$
$$(x - 3)^2 = 784$$
$$x - 3 = \pm 28$$
$$x = -25 \quad \text{or} \quad x = 31$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 46x = 2175$$

$$x^2 - 46x + 529 = 2704$$
$$(x - 23)^2 = 2704$$
$$x - 23 = \pm 52$$
$$x = -29 \quad \text{or} \quad x = 75$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 48x = 1188$$

$$x^2 - 48x + 576 = 1764$$
$$(x - 24)^2 = 1764$$
$$x - 24 = \pm 42$$
$$x = -18 \quad \text{or} \quad x = 66$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 42x = -425$$

$$x^2 + 42x + 441 = 16$$
$$(x + 21)^2 = 16$$
$$x + 21 = \pm 4$$
$$x = -25 \quad \text{or} \quad x = -17$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 - 28x = -192$$

$$x^2 - 28x + 196 = 4$$
$$(x - 14)^2 = 4$$
$$x - 14 = \pm 2$$
$$x = 12 \quad \text{or} \quad x = 16$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 - 56x = -703$$

$$x^2 - 56x + 784 = 81$$
$$(x - 28)^2 = 81$$
$$x - 28 = \pm 9$$
$$x = 19 \quad \text{or} \quad x = 37$$